

137-58-3-6040

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 3, p 228 (USSR)

AUTHORS: Pryakhina, L. I., Ozhimkova, O. V.

TITLE: Effect of Duration and Temperature of Aging on the High-temperature Strength Properties of the EI-437 Alloy (Vliyaniye vremeni i temperatury stareniya na zharoprochnost' splava EI-437)

PERIODICAL: V kn.: Issledovaniya po zharoprochnym splavam. Moscow, AN SSSR, 1956, pp 130-137

ABSTRACT: The high-temperature strength properties of the alloy EI-437 were studied, together with its hardness and microstructure, after it had been subjected to tempering in air starting at a temperature of 1100° and allowed to age for a period of up to 1000 hours at temperatures between 600° and 900°. The amount of excess phase, separated by means of electrochemical deposition, as well as the parameters of the crystal lattice of the primary solid solution were determined as a function of the temperature and the duration of aging. It is established that during the aging the hardness increases continuously up to 1000 hours at a temperature of 600°; at

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Effect of Duration and Temperature of Aging (cont.)

higher temperatures(800-900°) the hardness increases in the early stages of the aging process but gradually diminishes later. The amount of excess phase increases continuously with time at aging temperatures ranging from 600° to 700°, but decreases at 900°. Consistent with the separation of the excess phase from it, the lattice parameter of the primary solid solution decreases initially and then becomes stable. The excess phase, separated in the course of the aging process in the form of a fine dispersion, improves the high-temperature strength properties of the alloy; coagulation of the excess phase results in a weakening of the alloy and lowers its heat-resistant properties.

Bibliography: 8 references.

T. F.

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PRYAKHINA, L. I.

18-4E2C
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Investigation of Part of the Quinary System Nickel-Chromium-Tungsten-Titanium-Aluminum / L. I. Kornilov, L. I. Pryakhina, and O. V. Ozhimkova (*Izv. Akad. Nauk S.S.S.R.*, 1956, (Khim.), (8), 885-888). — [In Russian]. The interaction of the five metals of the system was studied in Ni solid soln. Polythermal sections were constructed with varying Ti, W, and Al content. In the case of variable Al content, Cr, Ti, and W were maintained const. at 20, 2, and 6 and 9%, resp.; it having been previously determined that alloys of the latter two sections correspond to quaternary solid soln. Tests for microstructure, hardness, sp. elect. resistance, and strength at elevated temp. were made. With the increase of Al content hardness increases from 185 to 328 kg./mm.²; sp. elect. resistance within the Al content range of 0.6-2.8% increases from 1.22 to 1.35 Ω .mm.²/m., reaching a max. of 1.37 Ω .mm.²/m. in the 3.4-5.1% Al range. Beyond this range a sharp fall from 1.37 to 1.02 Ω .mm.²/m. occurs, owing to the appearance of a second phase, in the form of coagulated particles, in alloys contg. >5% Al. Hardness and sp. elect. resistance curves show that property changes correspond to the compn. and phase changes in these alloys in the same way as in binary and ternary systems, justifying the conclusion that the method of investigation

adopted here is applicable to the investigation of other multicomponent metallic systems up to quaternary, and may make possible the study of new highly resistant alloys.

Z. N. P.

for 28
NT

Category : USSR/Solid State Physics - Mechanical properties of crystal and poly-crystalline compounds E-9

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 1362

Author : Kornilov, I.I., Pryakhina, L.I.

Title : Heat Resistance of Alloys of the Quaternary System Nickel -- Chromium -- Aluminum -- Niobium.

Orig Pub : Issledovaniya po zharoprochnym splavam. M., AN SSSR, 1956, 138-147

Abstract : An investigation was made of the heat resistance of alloys of the quaternary system Ni -- Cr -- Al -- Nb. The alloys were subjected to the following heat treatment: heating to 1150°C, soaking for six hours, cooling in air. The heat resistance of the alloys was investigated at 800°C at stresses of 6.7, 12.7, and 24.2 kg/mm². The maximum heat resistance is produced by those compositions of quaternary alloys corresponding to the transition region from solid solutions to alloys having a heterogeneous structure. These alloys have a structure of saturated and supersaturated solid solutions with finely dispersed segregation of the excess phase.

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137-58-4-8125

Translation from Referativnyy zhurnal. Metallurgiya. 1958, Nr 4, p 251 (USSR)

AUTHOR. Pryakhina, L.I.

TITLE. Phase Diagram and Properties of Alloys of the Ni-Ti System
(Diagramma sostoyaniya i svoystva splavov sistemy Ni-Ti)

PERIODICAL. Tr. In-ta metallurgii AN SSSR, 1957, Nr 2, pp 119-125

ABSTRACT. The microstructure, hardness, resistivity, and high-temperature strength of alloys of the Ni-Ti system were investigated. The starting substances were 99.8% Ni and 98.5% Ti. The specimens were held for 24 hours at 1150°C, cooled to 800°C, held 100 hours, and slowly cooled in the furnace. The solubility of Ti in Ni at 800°C is between 8 and 10.8% Ti. The maximum resistance to heat is also shown by these two alloys. The resistivity of the alloys rises with increase in Ti contents from 0.18 ohm/mm²·m at 1.7% Ti to 0.5-0.7 at 8-10 Ti and to 1.7 at 15-16 Ti. The hardness of the alloys also increases with rise in Ti contents. The existence of the alloy Ni₃Ti is confirmed. Ye. P.

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1. Nickel-titanium systems--Mechanical properties
2. Nickel-titanium systems--Electrical properties
3. Titanium
--Solubility

Pryakhina, L.I.
AUTHORS: Pryakhina, L. I. and Ryabtsev, L. A. (Moscow). 24-12-6/24

TITLE: Investigation of alloys of the quaternary system
nickel-chromium-titanium-aluminium. (Issledovaniye
splavov chetvernoy sistemy nikel'-khrom-titan-alyuminiy).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh
Nauk, 1957, No.12, pp.38-42 + 2 plates (USSR)

ABSTRACT: The personnel of the Metallic Alloy Chemistry Laboratory of
the Institute of Metallurgy, Ac.Sc. U.S.S.R. (Institut
Metallurgii) carried out during the last ten years
systematic investigations of solid solutions of nickel
consisting of 2, 3, 4 and 5 components (Refs.1-4).
This work also comprised investigations of alloys of the
quaternary system Ni-Cr-Ti-Al in the solid solution
range and the associated two-phase range. Alloys of this
system are of interest inasmuch as the nickel base alloy
3M-437 containing Cr-Ti-Al is widely applied in the
Soviet industry (Ref.5) and similar nimonic type alloys
are also extensively used outside the Soviet Union. In
the hardened state, this alloy has a polyhedral structure
of the solid solution; at the operating temperature (700
to 800°C) it is subjected to ageing and strain hardening
due to finely dispersed decomposition of the solid.

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Investigation of alloys of the quaternary system nickel-chromium-titanium-aluminium.

solution of nickel. Literary data on investigations of the diagram of state of the quaternary system Ni-Cr-Ti-Al were not available. However, after completion of this work a paper was published by Taylor (Ref.7), who obtained results similar to the results obtained by the authors of this paper. The authors investigated alloys of the partial quaternary system delimited by the components $\text{Ni-Ni}_3\text{Cr-Ni}_3\text{Al-Ni}_3\text{Ti}$ within the range of limited nickel base solid solutions and two-phase regions associated with these quaternary solid solutions. The diagrams of state of all the ternary systems of interest from this point of view (Ni-Cr-Al, Ni-Cr-Ti and Ni-Ti-Al) were investigated earlier (Refs.8-11). Using certain assumptions of the physico-chemical analysis, the authors attempted, on the basis of literary data, to construct a diagram of state of the quaternary system $\text{Ni-Cr-Ni}_3\text{Ti-Ni}_3\text{Al}$ to include the phase spaces at 1000°C (Fig.1). In the here described experiments, the authors applied thermal analysis, investigation of the micro-structure, the

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Investigation of alloys of the quaternary system nickel-chromium-titanium-aluminium.

hardness, the electric resistance and also the centrifugal method for investigating the heat resistance of alloys at elevated temperatures. The alloys were smelted in corundum lined crucibles in a laboratory high frequency furnace. For the investigations a cut through the quaternary system Ni-Cr-Ti-Al was chosen which passes through the region of limited solid solution of Ni(γ) and the two-phase region ($\gamma + \gamma'$). Table 1 gives data on the composition of the smelted Ni-Cr-Ti-Al alloys and some of their physical and chemical properties. Table 2 gives information on the sag during bending as a function of the testing time in hours for six specimens with various percentual aluminium contents for a stress of 8 kg/mm^2 at 900°C ; after 1000 hours a test was made with a stress of 12 kg/mm^2 and after 1100 hours with a test of 15 kg/mm^2 . A polythermal cut of the quaternary system Ni-Cr-Ti-Al with a variable aluminium content is given in the diagram, Fig.2. Figs. 3 and 4 contain microstructure photographs of this system of alloys with various composition and under various test conditions.

Card 3/4 It was found that an increase of the aluminium content

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Investigation of alloys of the quaternary system nickel-chromium-titanium-aluminium.

(for a 17 to 20% Cr content and 1.8 to 2.4% Ti content) improves greatly the heat resistance; an alloy containing 6.46% aluminium withstood 1000 hour loading with $\sigma = 8 \text{ kg/mm}^2$ at 900°C and did not fracture during a further 100 hours in the case of loading with a stress of 12 kg/mm^2 . There are 4 figures, 2 tables and 14 references, 9 of which are Slavic.

AVAILABLE: Library of Congress.

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PRYAKHINA, L.I.

Heat resistance at 800° of some 2-, 3-, 4-, and 5-component nickel alloys. L. I. Kornilov and L. I. Pryakhina. Doklady Akad. Nauk S.S.S.R. 112, 70-2 (1957). The heat resistances were compared of (a) Ni-Ti alloys with 0-14% Ti, (b) Ni-Cr-Ti alloys with a Cr content of 10 and 20%, and Ti of 0-15% (C.A. 51, 1005i); (c) Ni-Cr-Al-Nb system with Cr of 10 and 15%, Al 6%, Nb 0-12.5% (Issledeniya po Zharoprochnosti Splavov 1956, 133); and (d) Ni-Cr-W-Ti-Al with 20% Cr and Al of 0-12% (C.A. 51, 3418g). The heat resistance was detd. by the centrifugal method (Kornilov, Zavodskaya Lab. No. 1, 76 (1949)) which permitted a correlation of heat resistance properties with the phase structure of alloy systems. The results showed that with an optimum a concn. (Ti = 8-10.8%) alloys were not destroyed, but merely deformed ("safe load") at 5 kg./sq. mm.; in b (10% Cr, 6-7.5% Ti) the safe load was 8.4-10 kg./sq. mm.; in c (10-15% Cr, 6% Al, 2.5-6% Nb) the safe load was 24.7 kg./sq. mm.; and in d (20% Cr, 4-6% Al) the safe load became 35-40 kg./sq. mm., all in tests at 800°. The heat resistance of the 5-component system was thus 8-10 times greater than of the binary, 3-5 times greater than of the ternary, and double that of the 4-component system. W. M. Sternberg.

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78-3-3-29/47
AUTHORS: Kornilov, I. I. ; Pryakhina, L. I. ; Ozhimkova, O. V. ;
Snetkov, A. Ya.
TITLE: The Interaction of Titanium Carbide With Six-Component Solid
Solutions of Nickel (Vzaimodeystviye karbida titana s shesti-
komponentnym nikel'evym tverdy'm rastvorom)
PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958. Vol. 3. Nr 3. pp. 708-716
(USSR)
ABSTRACT: The chemical interaction of titanium carbide with six-component
solid solutions of nickel and the equilibrium between phases
in these complicated systems were investigated. In the alloys
with 9,3% titanium carbide an eutectic forms. At the eutectic
temperature of 1280°C the solubility of titanium carbide in
nickel amounts to 6,2 % at 700°C the solubility drops to 2 %.
With the produced alloys the following investigations were
performed: thermographic, metallographic and radiographic ana-
lyses as well as the hardness determination of the alloys.
The alloys of the solid nickel solutions with titanium carbide
are of eutectic nature and crystallize similar to the alloys

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The Interaction of Titanium Carbide With Six-Component Solid Solutions of Nickel

of the system Ni-TiC. At 1300°C the solubility of titanium carbide in the solid nickel solutions is 1,9 %. With a decrease of temperature the solubility of titanium carbide decreases, at 1250°C it is 1,4 %, at 1200°C - 0,55 %, at 1000°C 0,15 %. In the alloys with 50 % titanium carbide large crystals of titanium carbide which are enclosed by an eutectic composition occur after hardening at 1300°C. Samples hardened at higher temperatures have an higher hardness. In alloys of the above-mentioned system two phases were determined by the X-ray structural and microstructural investigation, as well as by selective solubility: an γ -phase of solid nickel solution with a boundary-centered cubic system and a phase of solid solution on the basis of titanium carbide. By a modification of the composition of the solid nickel solutions and of the content of titanium carbide alloys with different properties can be produced. There are 9 figures, 2 tables, and 9 references, 5 of which are Soviet.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Metallurgical Institute imeni A. A. Baykov, AS USSR)

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78-3-3-29/47

The Interaction of Titanium Carbide With Six-Component Solid Solutions of Nickel

SUBMITTED: June 25, 1957

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AUTHORS: Kornilov, I. I., Pryakhina, L. I., 20-119-3-23/65
Ozhimkova, O. V., Snetkov, A. Ya.

TITLE: On the Quasi-Binary Nature of the Six-Component Solid
Nickel Solution System Plus Titanium Carbide
(O kvazibinarnosti sistemy: shestikomponentnyy nikel'evyy
tverdyy rastvor + karbid titana)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 3,
pp. 501-503 (USSR)

ABSTRACT: The working out of new rational investigation methods of
the poly-component metal systems is necessary since general
principles of their study are missing and a clear demonstration
is difficult. Since the metals incline towards formation of
solid solutions and compounds, furthermore of solid
solutions on the strength of these compounds, much less
phases develop in poly-component systems than can be assumed
from the number of the components taking part. In consequence
of the chemical affinity between the elements and in
consequence of a certain activity degree of the reacting
elements in such systems it is possible to reduce the
investigation of the systems to the study of the equilibrium

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On the Quasi-Binary Nature of the Six-Component Solid
Nickel Solution System Plus Titanium Carbide

20-119-3-28/65

between a limited phase number (ref 1). Therefore it is sufficient in the case of several systems in question to investigate the 3-phase equilibrium: poly-component solution (liquid) \rightleftharpoons polycomponent solution (solid) plus metal compound. As example the authors chose an eight-component system: Ni-Cr-W-Mo-Nb-Ti-Al-C, in the case of which a 3-phase-equilibrium can be obtained at a certain component combination: eight-component solution (liquid) \rightleftharpoons eight-component solution (solid) plus compound TiC or its solid solution. From the heat of formation of the carbides of the mentioned metals (Ni, Cr, W, Mo, Nb and Ti, table 1) the reaction course can be predicted: mainly titanium carbide will be formed in such a eight-component-nickel-system. It is formed with a maximum thermal effect and is the most stable one of all carbides in the system in question. In order to check these assumptions the chemical interaction between the six-component solid nickel solution (containing Cr 7%, W 3%, Mo 3%, Nb 2% and Al 3%) and titanium carbide was investigated. This solution was assumed as initial phase and the phase equilibrium in this eight-component system was

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On the Quasi-Binary Nature of the Six-Component Solid 20-119-3-28/65
Nickel Solution System Plus Titanium Carbide

determined. Nickel formed 82 %. Titanium carbide was added in quantities of from 0 to 95 %. The samples were produced by means of melting (up to 15 % Ti) and by means of powder metallurgical methods (25-95 % TiC). Furthermore the hardness of alloys rich in nickel was studied after hardening at 1250°, 1200°, and 1000°C. In order to determine the temperature interval of the crystallization of the alloys with from 0 to 15 % TiC, a thermal analysis was carried out. Figure 1 gives the fusibility diagram of the alloy mentioned in the title. The investigation of the microstructure of casted and hardened alloys confirms the eutectic structure of the corresponding alloy compositions. The solubility determination was carried out metallographically and radiographically. It was found that the TiC-solubility in the solid solution in question changes with the temperature at 1300°-1,4 %, at 1250°-1,4 %, at 1200°-0,4 % and at 1000°C approximately 0,1% TiC. In alloys with more than 5 % TiC, titanium carbide forms the phase which at first crystallizes. Its great cubical crystals are interspersed in the eutectic. In an

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On the Quasi-Binary Nature of the Six-Component Solid 20-119-3-28/65
Nickel Solution System Plus Titanium Carbide

alloy with 50% TiC there are great TiC crystals surrounded by eutectic after this hardening at 1300°C. The carbide phase only was isolated from alloys with 1,0; 4; and 7,5 % TiC by selective dis solution of the solid solution γ_6 . The provisional chemical analysis of this phase shows the presence of Ni, Mo, W, Cr and Al (beside Ti and C). These elements form apparently an ingredient of TiC. The composition of this phase changes according to that of the initial alloy. The lattice parameter amounts to from 4,38-4,33 kX. The titanium content in the phase in question increases with increasing content of the introduced TiC whereby the approximative atomic relation between the other metals and the carbon remains 1:1.

There are 1 figure, 1 table and 1 reference, which is Soviet

PRESENTED: October 11, 1957, by I.I. Chernyayev, Member, Academy of Sciences, USSR
SUBMITTED: October 1, 1957
AVAILABLE: Library of Congress

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PRYAKHINA, L.I.

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Abstracts not sent. Summary sent to problem electrophoretic separator.

Isolation of electrophoretic separator, Vol 6 (Investigations of the
Isolation of Electrophoretic Separator, Vol 6) Moscow, 1960. 319 p. Extra ill. inserted.
3,000 copies printed.

Reported by: Alexander Galt SSB. Initial: m'allard, lami A. A.
 Subject: Search over problems: zaprosyushch spavov.
 Answer: Search over problems: zaprosyushch spavov.

Editorial Board: L. P. Barilin (Dnepropetrovsk), V. V. Burdakov, B. V. Agapov, Corresponding Member, Academy of Sciences USSR (Kiev, U.S.S.R.), I. M. Pavlov, and I. P. Zolotarev, Candidates of Technical Sciences; M. of Publishing House: V. A. Elizarov, Tech. Sci. D. O. Ziborova.

SUMMARY: This book is intended for research workers in the field of physics of metals and for metallurgists, particularly those working on heat-resistant alloys.

CONCLUSIONS: The collection of 35 articles dealing with various problems in the production of nonferrous alloys, specially attention is paid to the modification of the properties of such metals as aluminum, copper, iron, and titanium, by the introduction of such elements as boron, carbon, and silicon for increasing their resistance and plasticity are described. Among the special problems discussed are electrolytic conductivity of iron-aluminum alloys in the solid state, the mobility of atoms in iron-boron alloys, depending upon the effect of their crystalline structure; the kinetics of change in tensile properties of titanium thermal transformation of mill bodies, etc. No conclusions are mentioned. References follow each article.

Correlation, A. D., L. D. DeHaven, and L. M. Kitch. Investigation of the Body Dimensions and Structure of Some Iron-Ore Miners, Depending on Their Composition.

Wittig, J. and V. E. Perlin. Effect of structure stability on
Self Distances 268

Emilio, Jr., L. J. Phillips, and O. Y. Oshkova. Effect of the Mass Factor on the Character of the Magnetic Capillary-Heat Resistance of the Pre-Component System H₂O - R - Fe - Al Alloys

Davidson, R.B., and V.A. Libby: The Present Status of the Problem of Irreversible Thermal Deformation of Cold Crystals 28

Pridmore, D. L. Four Articles of Macroscopic Flow, Creep, and Pulling 29

Investigation of Migration and Behavior of Benthic Invertebrates

Y. A. Emulov, M. P. Zhukovskiy, and M. V. Anisimov. Creating Properties of
Duct-Bonded Alloys

Bellini, G.T., and S.B. Majumdar. Investigation of the Phase Structure of Beryllium in Be-Be₂Ti-Alloys 21

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E111/E152

18.1250

AUTHORS: Kornilov, I.I., Pryakhina, L.I., and Ryabtsev, L.A.
(Moscow)

TITLE: Properties of Multi-Component Nickel Solid Solutions

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, Nr 2, pp 110-114 (USSR)

ABSTRACT: Kornilov has already shown (Refs 1 and 2) that the ability of elements to form solid solutions and inter-metallic compounds with nickel depends on the relative positions of these elements in the Periodic Table. A number of multi-component nickel solid solutions were synthesized for that work (the crystal-lattice type, atomic diameter and solubility in nickel are tabulated). In the present work the equilibria and some physico-chemical properties of solid solutions in the following systems were studied: 0, Ni-Al; I, Ni-Cr-Al; II, Ni-Cr-Ti-Al; III, Ni-Cr-Ti-W-Al; IV, Ni-Cr-Ti-W-Mo-Al; V, Ni-Cr-Ti-W-Mo-Nb-Al; VI, Ni-Cr-Ti-W-Mo-Nb-Co-Al. In each system one section with 0-12% Al and a constant quantity of other elements, except nickel, was studied: 10 wt.% Cr, 2 of Ti, 6 of W, 3 of Mo, 2 of Nb,

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Properties of Multi-Component Nickel Solid Solutions

5 of Co. The fusion diagrams for these systems were studied, the Al solubility limit being determined by microstructure, X-ray, hardness and electrical resistivity methods. The results for each system are plotted against wt.% aluminium in Fig 1. Fig 2 shows microstructures of one- and two-phase systems after hardening from 1200 °C. The lattice parameters for the solid solutions at 1200 °C as functions of aluminium content are shown in Fig 3. The resistivity of alloys after annealing and their hardness after hardening from 1200 °C are shown as functions of aluminium content in Figs 4 and 5, respectively. In this work the limiting concentrations of the elements were determined and the nature of the excess phases established. The degree of strain in the solid-solution crystal lattice increases with increasing difference between atomic diameters of the introduced element and of nickel. In order of decreasing lattice-disturbing effect the elements are Nb, W, Ti, Mo, Cr and Co. The hardness of nickel solid solutions could be increased considerably by

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Properties of Multi-Component Nickel Solid Solutions

multi-component alloying with those elements which
increase the state of strain of its lattice.

There are 5 figures, 1 table and 2 Soviet references.

SUBMITTED: June 24, 1959

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EO73/E535

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AUTHORS:

Kornilov, I. I., Ozhimkova, O. V. and Pryakhina, L. I.
(Moscow)

TITLE:

Relations Between the Composition, the Temperature and
the High Temperature Strength of Alloys of the System
Nickel-Chromium-Tungsten-Titanium-Aluminium

PERIODICAL:

Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh
nauk, Metallurgiya i toplivo, 1960, No.5, pp.137-141

TEXT:

The aim of the here described work was to study the
dependence of the diagram "composition-high temperature strength" on
the test temperature and the composition of alloys of a 5-component
system Ni-Cr-W-Ti-Al for a variable Al content. For investigating
the properties of some alloys of the Ni-Cr-W-Ti-Al system, one
polythermic cut was taken of the alloys with a constant content of
Cr, W, Ti and a variable content of Al (from 0 to 16%). Increase
in the Al content proceeded as a result of a drop in the Ni content.
Basically, the alloys of this section correspond to quaternary
uniform solid solutions. It can be seen from the fusion diagram
that addition to Al brings about a reduction of the liquidus
temperature from 1430°C (0% Al) to 1275°C (16% Al). For contents

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S/180/60/000/005/014/033

E073/E535

Relations Between the Composition, the Temperature and the High Temperature Strength of Alloys of the System Nickel-Chromium-Tungsten-Titanium-Aluminium

of 6.5% Al and more the cooling curves show a second step, which corresponds to the crystallization of the second phase that separates out in the form of a eutectic. For determining the solubility of Al in the nickel solid solution, the following heat treatment was applied: soaking for 100 hours at 1200°C, quenching in water with subsequent soaking at 1100, 1000, 950 and 800°C for 1000 hours, followed by cooling in water. The compositions of the alloys were in the range of quinary nickel-base solid solutions and rejection of the excess γ' -phase (on the basis of the Ni_3Al compound with a face-centred cubic lattice). Presence in alloys of the γ -phase was established by inter-metallide and X-ray structural analysis. It was established by microstructural analysis that the solubility of Al equals 5.5% at 1200°C, 4.2% at 1100°C, 3% at 1000°C and 2.2% at 800°C. The influence of temperature on the strength of the alloys was investigated on alloys with Al contents between 0.5 and 7.9% that correspond to uniform solid solutions as well as to two-phase alloys. The test specimens were produced by precision casting

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S/180/60/000/005/014/033
E073/E535

Relations Between the Composition, the Temperature and the High Temperature Strength of Alloys of the System Nickel-Chromium-Tungsten-Titanium-Aluminium

and subsequent soaking at 1150°C for 7 hours, followed by cooling in air. Study of the high temperature strength was effected by applying the centrifugal bending method at the following initial stresses

t, °C	700,	800,	950,	1000,	1100,	1200
σ , kg/mm ²	50,	30-40,	15,	10,	3,	1.2

It was established that at 1200°C the maximum high temperature strength is obtained for alloys which correspond to strongly rarefied solid solutions; in the temperature range 1100 to 1050°C the highest strength was obtained for alloys that are distributed along the line of limit solubility and regions adjacent to it; at temperatures of 1000°C and lower, the highest strength was obtained for alloys from the range of saturated solid solutions that contain rejected finely dispersed excess phases. There are 3 figures and 4 Soviet references.

SUBMITTED: April 1, 1960

Card 3/3

KORNILOV, I.I.; PRYAKHINA, L.I.; OZHIMKOVA, O.V.

Effect of the time factor on the characteristics of the constitution -
heat-resistance diagram of five-component alloys in the system Ni -
Cr - W - Ti - Al. Issl. po zharopr. splav. 6:278-283 '60.

(MIRA 13:9)

(Alloys--Thermal properties)

(Phase rule and equilibrium)

81703

S/020/60/132/05/31/069
B011/B126

18.7500
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AUTHORS:

Kornilov, I. I., Pryakhina, L. I., Ozhimkova, O. V.

TITLE:

The Influence of the Time Factor on the Character of the
Composition - Heat Resistance Diagrams of Alloys of the
Ni - Cr - W - Ti - Al Five Component System

PERIODICAL:

Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 5,
pp. 1086 - 1089

TEXT: The authors wanted to examine the simultaneous influence of the composition and a long conversion time on the heat resistance of alloys. With this object in view, they studied the creeping of alloys of one of the cross sections of the above system, with Ni replaced by Al, within 0 to 7.9%, and with a constant Cr, W, and Ti content. The phase diagram of the cross-section analyzed is given in Fig. 1. In order to examine creeping, the samples were heated to 1150°C, maintained at this temperature for seven hours, and then cooled in air. After such homogenization, the compounds with up to 5.1% Al showed a structure of solid five-component solutions with a small quantity of excess γ -phase, which was

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The Influence of the Time Factor on the
Character of the Composition - Heat
Resistance Diagram of Alloys of the Ni - Cr - W - Ti - Al Five Component
System

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S/020/60/132/05/31/069
B011/B126

separated due to the cooling in air. Above this Al content, an eutectic appears, consisting of solid γ -solution and the γ' -phase. The alloys were analyzed for creeping by the centrifugal method at 900° with an initial tension of 6 kg/mm^2 . From the curves in Fig. 2 it can be seen that the alloys with a high Al content (6.5 and 7.9%), whose composition comes in the range of common crystallization of the solid γ -solution and the eutectic, have proved themselves to be not resistant to heat. From the curves in Figs. 2 and 3 it follows that an alloy with a maximum supersaturation (with 5.1% Al) for a short deformation-time (300-400 hours), is the most heat-resistant. If the time is increased to 700-800 hours, then alloys with a lesser degree of supersaturation are the most heat-resistant (3.4, 2.8, and 1.8% Al), which lie on the border of the maximum aluminum solubility. On further tests for creeping of up to 10,000 hours duration, the whole character of the curves for single alloys does not change, except in alloys with 2.8 and 3.4% Al. This shift of the heat resistance maximum in the phase diagram is due to the

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81703

The Influence of the Time Factor on the
Character of the Composition - Heat
Resistance Diagram of Alloys of the Ni - Cr - W - Ti - Al Five Component
System

S/020/60/132/05/31/069
B011/B126

influence of the time factor on the physico-chemical conversion processes and on the structure changes of the alloys during the tests. The alloys with maximum supersaturation have, on a short test, the highest solidity, since the inner tensions in the lattice of the solid solution are great. This solidifying effect decreases in the range of less supersaturated solutions and in the range of the formation of eutectic mixtures on crystallization. On longer tests the solidifying also decreases due to the varied effect of the time factor. The solidification decreases even more, the higher the degree of supersaturation and the longer the duration of the test. In the latter case, diffusion processes also take effect. The formation of an excess phase, and its subsequent coagulation lower the heat resistance. Thus the authors have proved that the heat resistance maxima in the isothermic diagrams composition versus heat resistance are dependent on both temperature and time. Kurnakov compounds are mentioned. There are 3 figures and 9 references: 5 Soviet, 1 British, and 3 American.

✓

Card 3/4

The Influence of the Time Factor on the
Character of the Composition - Heat
Resistance Diagram of Alloys of the Ni - Cr - W - Ti - Al Five Component
System

81703
S/020/60/132/05/31/069
B011/B126

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the
Academy of Sciences, USSR)

PRESENTED: December 20, 1959, by I. P. Bardin, Academician

SUBMITTED: December 10, 1959

4

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22957

S/126/61/011/005/002/015
E193/E183

18.1250

AUTHORS: Pryakhina, L.I., Snetkov, A.Ya., and Ryabtsev, L.A.

TITLE: X-ray investigation of nickel-base multi-component
solid solutions

PERIODICAL: Fizika metallov i metallovedeniye, Vol.11, No.5, 1961,
pp. 670-676

TEXT: Many nickel-base alloys of industrial importance belong to complex systems, characterized by limited solid solubility which decreases with decreasing temperature. The formation of solid solutions of this type entails the appearance of additional bonds between the valency electrons of unlike atoms which, in turn, brings about an increase in the strength of the solvent metal. The concentration dependence of many properties of alloys of this type is often reflected in the concentration dependence of the lattice parameter, and it was for this reason that the present authors studied the effect of simultaneous introduction of several alloying additions on the lattice parameters of nickel-aluminium solid solutions. To this end, a vertical section of each of the following systems was investigated:
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S/126/61/011/005/002/015
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X-ray investigation of nickel-base multi-component solid solutions

Ni — Cr — Al

Ni — Cr — Ti — Al

Ni — Cr — Ti — W — Al

Ni — Cr — Ti — W — Mo — Al

Ni — Cr — Ti — W — Mo — Nb — Al

Ni — Cr — Ti — W — Mo — Nb — Co — Al.

The Cr, Ti, W, Mo, Nb and Co content in all the alloys studied was the same and amounted to 11.1, 2.4, 1.96, 1.93, 1.3 and 5.2 at.% respectively, the Al content in each section varying between zero and 23 at.%. The composition of the experimental alloys was such that all the alloying additions formed unsaturated Ni-base solid solutions which became saturated only as a result of increasing the Al content with subsequent precipitation of a second phase, the same in each system (the γ' -phase). The experimental alloys were quenched from 1200 °C after 200 hours at the temperature, and from 1000 °C after 400 hours at the temperature; in the latter case the treatment was preceded by 200 hours' holding at 1200 °C. In the case of alloys quenched from 1000 °C, the X-ray analysis was carried out on powder specimens (filings) which, in order to remove

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S/126/61/011/005/002/015
E193/E183

X-ray investigation of nickel-base multi-component solid solutions the effect of plastic deformation, were annealed for 5 hours at 1000 °C. The use of powder specimens of the alloys quenched from 1200 °C was not possible, because their composition would be bound to change during annealing at this temperature owing to losses due to volatilization; in this case massive specimens and the back-reflection technique were used. The data on solid solubility limits, determined from X-ray data, were checked by metallographic examination. Typical results are reproduced in Fig.7, where the lattice parameter (a , kX) is plotted against the Al content (at.%), curves 1-6 relating to the following systems:
1 - Ni-Cr-Al; 2 - Ni-Cr-Ti-Al; 3 - Ni-Cr-Ti-W-Al;
4 - Ni-Cr-Ti-W-Mo-Al; 5 - Ni-Cr-Ti-W-Mo-Nb-Al;
6 - Ni-Cr-Ti-W-Mo-Nb-Co-Al.

The solid solubility limit of aluminium in various systems at 1200 °C and 1000 °C is given in Table 2. Finally, the effect of various elements on the lattice parameter of nickel-base solid solutions is given in Table 3. The following general conclusions were reached. 1. The solid solubility of aluminium in nickel
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E193/E183

X-ray investigation of nickel-base multi-component solid solutions decreases with decreasing temperature and increasing number of the alloying additions studied. 2. With increasing number of the alloying additions, the lattice parameter of the Ni-base (both single- and two-phase) alloys increases. The effect of various elements is not the same, its magnitude, i.e. the increase per one at.% of the element added, increasing in the following order: Co, Cr, Ti, Mo, W, Nb. 3. Increasing the number of the alloying additions brings about an increase not only in the lattice parameter (and consequently in the static lattice distortions) of the Ni-base solid solutions, but owing to the higher strength of the inter-atomic bonds, also in the stability of super-saturated solid solutions at temperatures below 1000 °C. There are 7 figures, 3 tables and 16 references: 12 Soviet and 4 non-Soviet. The English language references read as follows:
Ref.4: A. Taylor, R. Floyd. J.Inst.Metals, 1952-1953, 81, No.1, 25.
Ref.5: A. Taylor, R. Floyd. J.Inst.Metals, 1953, 81, No.9, 451.
Ref.6: A. Taylor, R. Floyd. J.Inst.Metals, 1952, 80, No.11, 577.
Ref.15: T.H. Hazelett, E. Parker. Trans.ASM, 1954, 46, 701.
Card 4/7

X-ray investigation of nickel-base... S/126/61/011/005/002/015
E193/E183

ASSOCIATION: Institut metallurgii AN SSSR
(Institute of Metallurgy, AS USSR)

SUBMITTED: August 6, 1960.

Table 2

System	Solubility of Al, at.%			
	Determined by X-ray method		Determined by microscopic method	
	1200°	1000°	1200°	1000°
Ni—Cr—Al	16.9	13.2	17.1	12.8
Ni—Cr—Ti—Al	11.5	8.5	11.8	9.0
Ni—Cr—Ti—W—Al	10.0	6.0	10.0	7.0
Ni—Cr—Ti—W—Mo—Al	10.0	5.0	10.0	6.0
Ni—Cr—Ti—W—Mo—Nb—Al	10.0	4.0	9.0	6.0
Ni—Cr—Ti—W—Mo—Nb—Co—Al	9.6	2.4	9.0	6.0

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18 9200 1413, 1418 2808 1416

25720
S/020/61/139/003/019/025
B103/B208

AUTHOR: Pryakhina, L. I.

TITLE: Studies in the field of multicomponent nickel systems

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 3, 1961, 618-621

TEXT: The purpose of the present study was to determine: (a) the distribution range of the solid nickel solution (denoted by γ_4) in the quasiquaternary system γ_4 -Ni₃Ti-Ni₃Al-Ni₃Nb; (b) the phase composition in ranges adjacent to γ_4 . Since the usual methods of geometric representation by means of projection cross sections meet with difficulties when studying the interaction of metals in multicomponent systems, and are applicable only to a limited extent to real metal systems, the author used the method developed by V. P. Radishchev (Ref. 1: Izv. sekt. fiz.-khim. anal. 22. 33 (1953)) and improved by F. M. Perelman (Ref. 2: Metody izobrazheniya mnogokomponentnykh sistem, Izd. AN SSSR, 1959). It is based on a representation of the composition of metal systems by regular simplex figures: a triangle for a ternary system, a tetrahedron for a quaternary

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S/020/61/139/003/019/025

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Studies in the field of...

system, and 5-, 6-, and 7-dimensional simplexes for systems with 5, 6, and 7 components, respectively. A cross section may be made through the simplex in a way that a figure results which is one unit smaller than the dimension. Fig. 1 presents one of the cross sections of the 7-component system Ni-Cr-W-Mo-Nb-Ti-Al. The vertex of the resulting tetrahedron represents the composition of 4 components: Ni, Cr, W, and Mo (in a certain proportion). The author made another cross section through the tetrahedron for the compounds Ni_3Nb , Ni_3Ti and Ni_3Al (Fig. 1), and thus confined herself only to the investigation of the quasiquaternary system mentioned above. All four components in the system were assumed to remain unchanged during the investigation. The author further regards a binary, a ternary, and a still more complicated solid solution in equilibrium as one single component. The alloys were melted in an arc furnace in argon atmosphere or in a non-radiative furnace in helium atmosphere in suspended state. The single-phase condition and the exact stoichiometric composition were checked for all components prior to the experiment. On the basis of her results and of published data, the author constructed schematic phase diagrams (at 1100°C) for four quasiternary systems forming the facets of the tetrahedron studied: (1) $\gamma_4 - Ni_3Ti - Ni_3Al$, (2) $\gamma_4 - Ni_3Al - Ni_3Nb$,

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S/020/61/139/003/019/025

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(3) γ_4 -NiTi-Ni₃Nb, and (4) Ni₃Ti-Ni₃Al-Ni₃Nb. She confirmed that a 1-phase, 2-phase, and 3-phase equilibrium exists in the 6-component alloys of (1)-(4). More than three phases could not be detected in solid state. These results of microstructure analysis were confirmed by X-ray structural analysis (by S. A. Yuganova and coworkers at the Tsentral'nyy nauchno-issledovatel'skiy institut transportnogo mashinostroyeniya (Central Scientific Research Institute of Transportation Machinery)) and by intermetallic analysis (by R. B. Golubtsova at the author's institute, and by L. A. Nade at the Central Scientific Research Institute of Transportation Machinery). Fig. 3 shows a projection of the mentioned tetrahedron to one of the coordinate planes. The phase diagrams of three quasiternary systems studied with a common vertex corresponding to γ_4 are well recognizable. As no deposition occurred in the anodic dissolution of alloys nos. 1, 3, 4, 13, and 17 (encircled numbers in Fig. 3), the author concludes that all of them represent single-phase solid solutions. This was confirmed by X-ray structural analysis for nos. 13 and 17. In the anodic dissolution of alloys nos. 6, 12, and 20 ($\gamma + \gamma'$ -range), of nos. 8 and 21 ($\gamma + \beta$ -range), and of nos. 7 and 22 ($\gamma + \eta$ -range), a deposit of

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the second phase contained in them was isolated. In nos. 6, 12, and 20, the γ' -phase of the solid solution on the $\text{Ni}_3\text{-Al}$ basis with a face centered cube was confirmed. The lattice parameter varied according to the contents of Cr, W, Mo, Nb, and Ti. Nos. 8 and 21 contain the η -phase which is a solid solution on the basis of Ni_3Nb with a rhombic structure. Also the parameters of the crystal lattice of the β -phase from nos. 8 and 21 differed slightly for the same reasons as nos. 6, 12, and 20. The deposits from nos. 6 and 21 consisted of the η -phase (Ni_3Ti) with a hexagonal lattice of dense packing. The β -phase contains small amounts of Cr, W, Mo, and Al in addition to Ni and Ti. This is considered a proof for the existence of a solid solution on the Ni_3Ti basis. Although Ni_3Ti has no homogeneous ranges in the binary system (Ref. 8: A. Taylor, R. Floud, J. Metals, 80, 11, 577 (1952)) it is apparently suitable as a basis for solid solutions in complicated alloys. The studies of the alloys from the β -phase ranges of the diagram are not yet completed. The author draws the following conclusions: Partial phase diagrams for multicomponent systems may be studied by successive cross sections in

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these systems in which not only single elements but also their solid solutions and metal compounds form the components. The total number of solid phases being in equilibrium in multicomponent systems is reduced by the fact that solid solutions can be formed by metals with one another, metal compounds with one another, and metals with metal compounds. No more than three phases could be confirmed in 6-component alloys of the system Ni-Cr-W-Mo-Nb-Ti-Al. The formation of solid solutions in multicomponent alloys was found to be possible not only on the basis of Ni_3Al , but also of Ni_3Nb and Ni_3Ti . Since most of the alloys with special properties (for new industrial fields) are solid solutions on the basis of some metal or metal compound, or are heterophase (where solid solutions are additionally solidified by a finely disperse separation of metallide phases), the investigation of phase diagrams of multicomponent systems may be limited to the study of partial diagrams, even to the study of individual cross sections in these diagrams. There are 3 figures and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc. The reference to the English-language publication is given in the body of the abstract.

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S/020/61/139/003/019/025
B103/B208

Studies in the field of...

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the Academy
of Sciences USSR)

PRESENTED: February 12, 1961, by I. I. Chernyayev, Academician

SUBMITTED: February 9, 1961

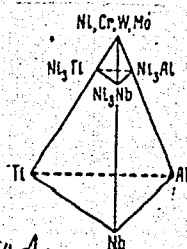


Fig 1.

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187510 1416

5707
S/C20/61/141/002/021/027
B101/B147

AUTHORS: Pryakhina, L. I., and Ryabtskov, L. A.

TITLE: Hardening of solid nickel solutions

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 2, 1961, 406-408

TEXT: The present paper deals with the hardening of metals which absorb foreign atoms as solid solutions, their crystal lattice thus being distorted. Hardening is achieved by this distortion. The effect of aluminum in the following systems was studied: Ni - Al (0); Ni - Cr - Al (I); Ni - Cr - Ti - Al (II); Ni - Cr - Ti - W - Al (III); Ni - Cr - Ti - W - Mo - Al (IV); Ni - Cr - Ti - W - Mo - Nb - Al (V); and Ni - Cr - Ti - W - Mo - Nb - Co - Al (VI). Portions (in % by weight) of 10 Cr, 2 Ti, 6 W, 3 Mo, 2 Nb, and 5 Co were added to Ni, thus preventing saturation of these metals. The addition of Al varied from 0 to 12%. At low aluminum concentrations, solid solutions were obtained. On supersaturation with Al, the γ' phase occurred in all alloys based on Ni₃Al with a face-centered, cubic lattice. The authors determined:

(1) the melting point; (2) the phase composition; (3) the parameters of
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30707
S/020/61/141/002/021/027
B101/B147

Hardening of solid nickel ...

the crystal lattices of solid solutions at 1200°C; (4) the heat resistance by the method involving centrifuging at 900°C and at a constant stress of 12 kg/mm². Results are given in Fig. 1. An increase of the addition of Al raised the heat resistance due to lattice distortion of the solid solutions. Alloys in which a finely disperse γ' phase formed, showed the highest heat resistance. The parameter α increased with increasing number of components. The relative change $\Delta\alpha$ per atom% of alloying element increased in the following sequence: Co, Cr, Ti, Mo, W, Nb. Accordingly, the hardening effect increased with increasing distance between the alloying metal and Ni in the periodic table. There are 1 figure and 11 Soviet references.

ASSOCIATION: Institut metallurgii im. A. A. Baykova Akademii nauk SSSR
(Institute of Metallurgy imeni A. A. Baykov of the Academy of Sciences USSR)

PRESENTED: June 10, 1961, by I. I. Chernyayev, Academician

SUBMITTED: June 8, 1961

Card 2/4

PRYAKHINA, K.F.

Regenerating a nickel catalyst. Trudy Bash NIINP no.5:312-314 '62.
(MIRA 17:10)

1. Ordena Lenina Ufimskiy neftepererabatyvayushchiy zavod.

40981

S/659/62/009/000/015/030
1003/1203

AUTHORS Kornilov, I. I., Pryakhina, L. I. and Ryabtsev, L. A

TITLE Heat resistance of binary and polycomponent nickel-base alloys

SOURCE Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam
v 9 1962. Materialy Nauchnoy sessii po zharoprochnym splavam (1961 g.), 114-119

TEXT The above property was determined from measurements of the bend radius at 900°C and from measurements of red-hardness at 600°, 800°, 900° and 1000°C. It is shown that alloying the metal with the elements (Cr, Ti, W, Mo, Nb, Co) in amounts up to their solubility limit and the precipitation of a fine dispersed γ phase, has a favourable influence on the heat-resistance of the alloys investigated. The heat resistance also increases with increase in the number of alloying components. In the discussion, M. P. Borzdyka suggested that the relationship between the bend radius and the heat resistance of the alloy is not as claimed by the authors. There are 3 figures.

Card 1/1

TAVADZE, F.N., akademik; PRYAKHINA, L.I.; SIMONISHVILI, T.V.

Equilibrium of alloys based on γ -solid solution in the system
Fe - Cr - Ni - Mn - Nb - V - Si. Dokl.AN SSSR 145 no.1:112-114
Jl '62. (MIRA 15:7)

1. Institut metallurgii imeni A.A.Baykova. 2. Akademiya nauk
Gruzinskoy SSR (for Tavazde).
(Iron alloys) (Phase rule and equilibrium)

ACCESSION NR: AT4013944

S/2659/63/010/000/0168/0174

AUTHOR: Kornilov, I. I.; Pryakhina, L. I.; Ozhimkova, O. V.

TITLE: The effect of prolonged aging on the phase composition, structure and properties of the alloys of a Ni - Cr - W - Ti - Al system

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 10, 1963, 168-174

TOPIC TAGS: alloy aging, alloy phase composition, alloy heat resistance, alloy hardness, alloy structure, alloy property age dependence, nickel alloy, Ni - Cr - W - Ti - Al alloy, chromium containing alloy, tungsten containing alloy, titanium containing alloy, aluminum containing alloy

ABSTRACT: This study attempts to determine the effect of long-term aging on the phase composition, structure, and alloy properties of a Ni - Cr - W - Ti - Al system. It is related to a general study of the various factors affecting the heat resistance of alloys. It has been successfully demonstrated that along with the test temperature, the time factor also exerts a great influence on this parameter. This paper deals with an investigation of the simultaneous effect of chemical composition, structure, and extended conversion time on the heat-resistance of certain alloys. The alloys consist of a five-component system, Ni - Cr - W - Ti - Al.

ACCESSION NR: AT4013944

Al, in which the content of Cr, W, and Ti is constant while the content of Al is varied between 0.5 and 7.9%. The compositions of the alloys studied correspond to the single-phase region of five-part solid solutions with a nickel base and the two-phase region with separations of the excess γ' -phase (based on an Ni_3Al compound). Prior to the investigation, the alloy samples in the cast state were subjected to temperatures of 1200C for 134 hours, and then tempered in water. This heat treatment resulted in a fixing of the tempered state of the supersaturated solid solutions and the heterogeneous structure of a series of alloys with excess phase. A study of the effect of extended aging times (to 25,000 hours) at 900C on the phase conversions of the alloys of the Ni - Cr - W - Ti - Al system showed that five-component solid solutions of alloys containing 1.8-5.1% Al undergo disintegration during the aging process. The number and dimensions of the excess phase particles increase as a function of the extended aging time period. The investigation of the effect of long conversion time on alloy hardness for the same system led to the discovery that the greatest changes in hardness are observed during the first tens and hundreds of hours of crystallochemical reactions in the course of the aging process at 900C. In analyzing the effect of the time factor (at the same temperature--900C) on the heat resistance of the alloys of the Ni - Cr - W - Ti - Al system, the authors concluded that there was a difference in the effect of the crystallochemical reaction time on alloy heat resistance under the conditions of a short-term and long-term creep tests. Under the conditions of the

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ACCESSION NR: AT4013944

short-term test (up to 300-400 hours), the most heat resistant was found to be the alloy with the maximum supersaturation of solid solution (with 5.1% Al). In the extended tests, alloys with a lesser degree of supersaturation (with 3.4, 2.8 and 1.6% Al) become the most heat resistant. A double influence was established for the excess phase on the heat resistance of the alloys. The initial stage of the fine-dispersion disintegration of the supersaturated solid solution is characterized by a strengthening of the alloy and an increase in heat resistance. As the excess phase coagulates, softening of the alloy and a reduction of heat resistance occur. Orig. art. has: 4 figures.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of Metallurgy AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 00

SUB CODE: ML

NO REF SOV: 006

OTHER: 000

Card 3/3

TAVADZE, F.N.; PRYAKHINA, L.I.; SIMONISHVILI, T.V.

Investigating the effect of tungsten and aluminum on the structure and properties of an austenitic solid solution in the system iron - chromium - nickel - manganese - niobium - vanadium - silicon. Trudy Inst. met. no.12:125-131 '63.

(MIRA 16:6)

Systems(Chemistry))
(Tungsten)
(Aluminum)

L 39467-65 EPF(n)-2/EPR/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(t) ps-l/pu-l/pad
IJP(c) JD/HW/JG

ACCESSION NR: AP4047874

S/0279/64/000/005/0112/0117

AUTHOR: Pryakhina, L. I. (Moscow)

TITLE: The problem of investigating multicomponent metallic systems

SOURCE: AN SSSR. Izvestiya. Metallurgiya i gornoye delo, no. 5, 1964, 112-117, and insert facing p. 114

TOPIC TAGS: multicomponent metallic system, phase diagram, alloy, nickel, chromium, tungsten, molybdenum, niobium, titanium, aluminum, nickel base alloy, high strength nickel alloy, heat resistant nickel alloy

ABSTRACT: Partial phase diagrams of multicomponent systems can be constructed by using several successive sections of these systems. The components may be solid solutions or metallic compounds as well as the individual elements. A partial diagram of the 7-component system Ni-Cr-W-Mo-Nb-Ti-Al in the area of the γ -nickel solid solution, and the 2- and 3-phase areas adjacent thereto, was constructed from experimental and literature data. The investigated section was

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L 39467-65

ACCESSION NR: AP4047874

represented as a tetrahedron whose components apparently are γ_4 (a 4- component nickel solid solution containing Cr, W and Mo) and the metallic compounds Ni_3Al , Ni_3Ti and Ni_3Nb . The compositions of coexisting phases in many of the high strength and heat-resistant nickel-based alloys can be explained from these diagrams. They can also be used as a theoretical basis for obtaining metallic alloys with given properties. The same method may be used for constructing partial phase diagrams of multicomponent systems based on other groups of elements, e.g., Ti, Nb, Fe and others, under conditions when small changes in the initial solid solution composition do not disturb its homogeneity. Orig. art. has: 6 figures.

ASSOCIATION: None

SUBMITTED: 26Jul63

ENCL: 00

SUB CODE: MM

NR REF SOV: 014

OTHER: 005

Card 2/2 p/b

PRYAKHINA, L.I.; PERVIKOVA, V.N.; PODYLINA, M.G.

Plotting of phase diagrams for multicomponent metal systems.
Dokl. AN SSSR 154 no.5:1132-1134 F'64. (MIRA 17:2)

1. Institut metallurgii im. A.A. Baykova. Predstavleno
akademikom I.V. Tananayevym.

PERVIKOVA, V.N.; FRYAKHINA, L.I.; PODYLINA, M.G.

Graphing of a phase diagram of the quaternary system in a projection
with numerical markings. Zhur. neorg. khim. 10 no.9:2198-2199 S '65.
(MIRA 18:10)

ACC NR: AT603442 (A) SOURCE CODE: UR/0000/66/000/000/0104/0109

AUTHOR: Pryakhina, L. I.; Polyakova, R. S.

ORG: none

TITLE: Metal chemistry of tungsten

SOURCE: AN SSSR. Institut metallurgii. Svoystva i primeneniye zharoprochnykh splavov (Properties and application of heat resistant alloys). Moscow, Izd-vo Nauka, 1966, 104-109

TOPIC TAGS: tungsten, tungsten containing alloy, solid solution, physical chemistry property

ABSTRACT: The article is a review of the properties of tungsten and its alloys, based entirely on literature data; it contains no experimental data. The formation of solid solutions of tungsten and other elements is determined by the following metallochemical properties: 1) the closeness of the chemical properties of the metals which is determined by their position in the periodic table and in the electronegative series of the elements; 2) for formation of continuous solid solutions, the difference in the atomic radius of the elements should not exceed approximately 10%; 3) the formation of continuous solid solutions requires isomorphism of the crystal structure of the components. The article proceeds to a classification of the elements of the periodic

Card 1/2

ACC NR: AT603442

table on the basis of their reaction with tungsten. The article also gives diagrams of state for alloys of tungsten with other elements, on the basis of which can be created alloys based on binary, ternary, and other more complex systems. Orig. art. has: 4 figures.

SUB CODE: 11/ SUBM DATE: 10Jun66/ ORIG REF: 021/ OTH REF: 004

Card 2/2

KRASYUKOV, A.F.; PIYAKHINA, M.S.

Developing a method for the determination of the adsorption capacity
of petroleum coke. Trudy Bash NIINP no.5:289-295 '62.

(MIRA 17:10)

AID P - 4709

Subject : USSR/Aeronautics - Biographic
Card 1/1 Pub. 58 - 4/14
Author : Pryakhina, N., Master of Sports, Champion of the USSR
Title : A Dream come True
Periodical : Kryl. rod., 6, 5, Je 1956
Abstract : Autobiography describing the career of the author as
parachutist. Photo of the author. The article contains
no factual data of general interest.
Institution : None
Submitted : No date

L-13292-66

ACC NR: AP6000325

method in which the catalyst contains from 5 to 80 % aluminum oxide, from 95 to 10 % magnesium oxide, from 0 to 50 % silicon oxide and from 0 to 5 % of a salt or oxide of an alkali metal.

SUB CODE: 07/ SUBM DATE: 11Apr63/ ORIG REF: 000/ OTH REF: 000

jw
Card 2/2

PRYAKHINA, N., championka SSSR, master sporta.

A fulfilled dream. Kryl.red.7 no.6:5 Je '56. (MLRA 9:9)
(Priakhina, Nadezhda) (Parachutists)

IRYANKINA, N., zasluzhennyi master sporta

Cupolas in the sky. Kryn. rod. 14 no.8:22-23 Ag '63.

(MIRA 16:8)

(Tushino--Parachuting)

PRYAKHINA, N.

85-9-4/33

AUTHORS: Ryabov N.; Pryakhina N., Master of Sports; Sumskiy, B., Pilot-Instructor, Aeroclub of Zaporozhskaya Oblast'; Vanin P., Deputy Head of the Orsk Aeroclub for Political Matters

TITLE: To Meet the 40th Anniversary of the Great October Revolution (Navstrechu 40-letiyu velikogo oktyabrya)

PERIODICAL: Kryl'ya Rodiny, 1957, Nr 9, pp. 4-5 (USSR)

ABSTRACT: The article consists of 4 letters from various parts of the Soviet Union, describing the latest achievements of the local DOSAAF organizations, viz.:
1) A letter from Kishinev, signed by N. Ryabov and entitled "With the help of Voluntary Instructors" (S pomoshch'yu instruktorov-obshchestvennikov), which speaks of the interest the young people of the Moldavian SSR show in various aviation sports.
2) A letter from Zaporozh'ye, signed by B. Sumskiy and entitled "Competition in Action" (Sorevnovaniye v deystvii), which relates the course and results of a competition in training young pilots, held between the author and one other pilot-instructor of the same aeroclub.

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85-9-4/33

To Meet the 40th Anniversary of the Great October Revolution (Cont.)

3) A letter from Tushino, signed by N. Pryakhina and entitled "Five Records" (Pyat' rekordov), which narrates how the author, a parachutist, succeeded to achieve in the year 1957 five different records.

4) A letter from Orsk (Chkalovskaya Oblast', RSFSR), signed by P. Vanin and entitled "Parachutists' Circles in Virgin Lands" (Kruzhki Parashyutistov na Tseline), which deals with the organization of the training of young parachutists in the region. The article contains no data of scientific interest. One photo.

AVAILABLE: Library of Congress

Card 2/2

18 8300

21001
S/080/61/034/006/006/020
D247/D305

AUTHORS: Kochergin, V.P., Bormotova, L.V., Pryakhina, N.M. and Asanova, E.P.

TITLE: Corrosion of iron in fused chlorides and carbonates of alkali and alkaline-earth metals

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 6, 1961, 1258 - 1266

TEXT: The literature on this subject is considered to be inconclusive. Some workers holding that alkali metal carbonates at high temperatures do not react with iron, others such as W.D. Tomashov and N.I. Tugarinov (ref. 2: ZhPKh, 1957, vol. 30, p. 1619) taking the opposite view, assuming the carbonates to be depolarizers during dissolution of iron in fused chlorides. Results are reported of determinations of iron corrosion rates in melts of Li_2CO_3 - NaCl , Na_2CO_3 - NaCl , K_2CO_3 - NaCl , BaCO_3 - NaCl , Na_2CO_3 - LiCl , Na_2CO_3 - KCl , Na_2CO_3 - CaCl_2 , and Na_2CO_3 - BaCl_2 . Chemically pure salts were used to

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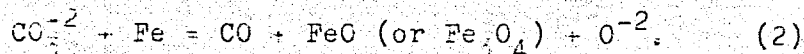
24004

S/080/61/034/006/006/020

D247/D305

Corrosion of iron in ...

prepared the melts in crucibles of alundum, platinum or zirconia. The iron specimens were carefully polished Armco plates. Corrosion rate in melts was gravimetrically determined after 1 hour's soaking at the experimental temperature, using 3 to 6 specimens in each case. Iron corrosion rates are shown. X-ray analysis showed the corrosion products to be basically iron oxides. It was also shown that the degree of dissociation of the carbonates is maximum for Li_2CO_3 , minimum for Na_2CO_3 , with K_2CO_3 intermediate. The rate of Fe oxidation in these salt melts shows the same order (for melts with NaCl in each case). The reaction in this case is: $\text{Fe} + \text{CO}_2 = \text{FeO}$ (or Fe_3O_4) + CO. Combustion of the CO formed was visible. In the melt of Na_2CO_3 -KCl (50 %), the CO_3 ions are less strongly bonded to the K ions than to the Na ions owing to the difference in ionic radii and the reaction takes place according to the equation:



The oxides of the alkali metals formed partially combine with iron oxide in the melts to give ferrites. This process, like the first

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reaction, is more probable at elevated temperatures. Iron corrosion rate determination results are shown for melts of $\text{Na}_2\text{CO}_3\text{-NaCl}$, $\text{Li}_2\text{CO}_3\text{-NaCl}$, $\text{K}_2\text{CO}_3\text{-NaCl}$, $\text{BaCO}_3\text{-NaCl}$, $\text{Na}_2\text{CO}_3\text{-KCl}$, $\text{Na}_2\text{CO}_3\text{-LiCl}$ (chloride content 50 %) and $\text{Na}_2\text{CO}_3\text{-CaCl}_2$ (75 %) and $\text{Na}_2\text{CO}_3\text{-BaCl}_2$ (75 %), for temperatures of 700 - 900°C. General increases of the Fe corrosion rate with temperature are given. The rate in $\text{K}_2\text{CO}_3\text{-NaCl}$ at 800-900°C is somewhat higher than in $\text{Li}_2\text{CO}_3\text{-NaCl}$, but this is reversed at 700°C. It is concluded that the depolarizing and oxidizing activity of CO_3^{2-} ions in the melt, and of the products of their thermal decomposition, is a maximum with the same ratio of carbonates to chlorides of various metals. A displacement of the maximum of the iron oxidation isotherm in $\text{Li}_2\text{CO}_3\text{-NaCl}$ melts in the range of high Li_2CO_3 content (60 %) is apparently due to increased thermal dissociation of Li_2CO_3 at 800°C to form a large amount of CO_2 to interact with Fe. In some of these melts, Fe oxidation was reduced by formation of a dense oxide layer on the metal. The processes occurring at the melt-metal interface were studied by determining the e.m.f. in the Fe/Melt/Pt system. Determined

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minations were made in an N_2 atmosphere at $750^\circ C$ in a quartz tube provided with a special device for introducing the metal specimen into the melt. The e.m.f. was measured with a potentiometer (PPTV-1). Results for melts of K_2CO_3 -NaCl, Na_2CO_3 -NaCl, Li_2CO_3 -NaCl (containing 50 % NaCl), $BaCO_3$ -NaCl (56 %), Na_2CO_3 -KCl (50 %), Na_2CO_3 -LiCl (50 %), Na_2CO_3 - $CaCl_2$ (23 %) and Na_2CO_3 - $BaCl_2$ (25 %) are shown in Fig. 6. It is generally concluded that on increasing the alkali- or alkaline-earth carbonate content of the melts studied, iron corrosion rate increases to a maximum and then decreases. The degree of thermal dissociation of carbonates of Li, K or Na is reduced by addition of 50 % NaCl at $800^\circ C$ and the same is true of NaCl to which chlorides of Ca, Ba, Hf, K or Na are added. The e.m.f. of a Fe/melt/Pt galvanic cell in these melts at $750^\circ C$ is a maximum with K_2CO_3 -NaCl and a minimum with Li_2CO_3 -NaCl (each with 50 % NaCl). There are 6 figures and 31 references: 15 Soviet-bloc and 16 non-Soviet-bloc. The four most recent references to the English-language publications read as follows: D.D. Williams, J.A. Grand, and R.R. Miller, J. Am. Chem. Soc., 78, 5110, 1956; O. Bales-

Card 4/6

Corrosion of iron in ...

24001
S/C80/61/034/006/006/020
D247/D305

tra, Metal Progress, 1, 1957; F. Bacon, J.S. Forrest, The Eng.,
202, 93, 1956; M.E. Straumanis, and A.W. Schlechten, J. Electroch.
Soc., 102, 131, 1955.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet imeni A.M.
Gor'kogo (Ural State University, imeni A.M. Gor'kiy)

SUBMITTED: July 8, 1960

Card 5/6

Corrosion of iron in ...

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D247/D305

Fig. 6. E.m.f. of Pt/melt/Fe cell with the various melts.

Legend: A - e.m.f. value (volts);
B - time (min). Melts at 800°C. -
1. K_2CO_3 -NaCl; 2. Na_2CO_3 -NaCl;
3. Na_2CO_3 -KCl; 4. Na_2CO_3 -CaCl₂;
5. Na_2CO_3 -BaCl₂; 6. Na_2CO_3 -LiCl;
7. $BaCO_3$ -NaCl; 8. Li_2CO_3 -NaCl.

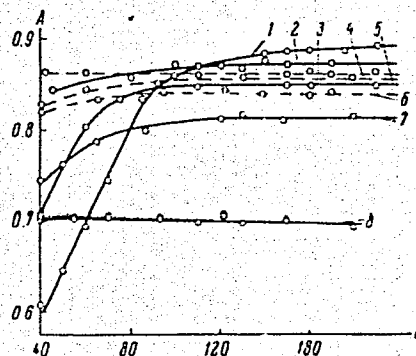


Рис. 6. Эдс ячейки Pt-солевой расплав/Fe в присутствии расплавов.

A - значение эдс (V), B - время (мин.).
Расплавы при 800°C: 1 - K_2CO_3 -NaCl, 2 -
 Na_2CO_3 -NaCl, 3 - Na_2CO_3 -KCl, 4 - Na_2CO_3 -CaCl₂,
5 - Na_2CO_3 -BaCl₂, 6 - Na_2CO_3 -LiCl, 7 -
 $BaCO_3$ -NaCl, 8 - Li_2CO_3 -NaCl.

Card 6/6

L 36177-66 EWT(m)/EWP(j)/T IJP(c) RM/DJ

ACC NR: AP6014267

SOURCE CODE: UR/0153/ /009/001/0126/0127

AUTHOR: Gridunov, I. T.; Chirkov, N. M.; Pryakhina, S. F.; Lisitsyn, D. M.; Raspopov, L. N.

ORG: Rubber Technology Department, Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Kafedra tekhnologii reziny, Moskovskiy institut tonkoy khimicheskoy tekhnologii)

TITLE: Use of atactic polypropylene⁵ in Nairit rubbers¹²

SOURCE: IVUZ. Khimiya i khimicheskaya tekhnologiya, v. 9, no. 1, 1966, 126-127

TOPIC TAGS: polypropylene plastic, plasticizer, synthetic rubber, carbon black

ABSTRACT: In order to study the plasticizing properties of atactic low-molecular polypropylene, the latter was introduced into TM-70 rubber (containing 30 pts. by wt. of carbon black) in amounts from 5 to 50.0 pts. by wt. per 100 pts. by wt. of Nairit, and the physicochemical properties of the mixes obtained were measured. It was found that the polypropylene is best introduced and distributed throughout the mixture if it is first heated to 70-80°C; adhesion of the rubber mix to metal surfaces in the course of its preparation and vulcanization is thus completely eliminated. A comparative study of TM-70 Nairit vulcanizates extended with 30 pts. by wt. of carbon black and containing 20 pts. by wt. of atactic polypropylene and 5.5 pts. by wt. of chlorinated paraffin showed that at this polypropylene content the Nairit rubber mixes

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ACC NR: AP6014267

contain the lowest amount of the gel fraction; the cross-links density (M_c) of the vulcanizates decreases; the dynamic modulus E , internal friction modulus K , and heat production are reduced; the fatigue resistance in compressive deformation, tensile deformation and reverse bend is increased; and the resistance to thermooxidative processes and wear resistance are increased. It is concluded that atactic polypropylene should be used as a plasticizer for Nairit mixes. Orig. art. has: 2 tables.

SUB CODE: 11/ SUBM DATE: 28Jan64/ ORIG REF: 001

Card 2/272P

BOGUSLAVSKAYA, K.V.; VALOVA, G.M.; GRISHCHUK, N.P.; DROZD, L.G.; KOLOBENIN, V.N.;
PRIZHINA, E.F.; SOKOLOV, V.D.; BOGUSLAVSKIY, D.B.

Single-stage manufacture of carcass compounds with the addition of
sulfur during processing in the rubber mixer. Kauch. i rez. 24
no.10-12-14 '65. (MTP: 18-10)

1. Dnepropetrovskiy shinnyy zavod i Dnepropetrovskiy filial Nauchno-
issledovatel'skogo instituta shinnoy promyshlennosti.

GRIDUNOV, I.T.; STRIZHENOV, S.I.; PRYAKHINA, S.F.; SOKOLOVSKIY, A.A.

Device for repeated extension of rubbers. Zav.lab. 29 no.12:1505
'63. (MIRA 17:1)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii.

GRIDUNOV, I.T.; PRYAKHINA, S.F.; SOKOLOVSKIY, A.A.

Effect of deformation conditions on the dynamic stability of
nairit rubbers. Izv.vys.ucheb.zav.;khim.i khim.tekh. 6 no.5:
851-855 '63. (MIRA 16:12)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni
Lomonosova, kafedra tekhnologii reziny.

GRIDUNOV, I. T.; PRIYAKHINA, S. F.; ASTRAKHANTSEVA, N. I.

Temperature resistance of the nairit rubber and chlorosulfonated polyethylene. Izv. vys. ucheb. zav.; khim. i khim. tekhn. 5 no.5:821-826 '62. (MIRA 16:1)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova, kafedra tekhnologii reziny i tekhnologii pererabotki polimerov.

(Chloroprene—Thermal properties)

(Polyethylene—Thermal properties)

GRIDUNOV, I.T.; PRYAKHINA, S.F.; KLYKOVA, V.I.; VAN SYU-KHUA [Wang Hsiu-hua]

Production of noncombustible rubbers. Izv.vys.ucheb.zav.;khim.i
khim.tekh. 5 no.3:484-490 '62. (MIRA 15:7)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni
Lomonosova, kafedra tekhnologii pererabotki polimerov i
tekhnologii reziny.

(Rubber)

SOV/69-21-2-9/22

5(3)

AUTHORS: Dogadkin, B.A., Kuleznev, V.M., Fryakhina, S.F.

TITLE: On the Compatibility of Polymers in Solution (K voprosu o sovместимости полимеров в растворе)

PERIODICAL: Kolloidnyy zhurnal, 1959, Nr 2, pp 174-180 (USSR)

ABSTRACT: This is a report on an investigation concerning the behaviour of mixtures of natural and butadiene styrene rubber in a common solution. The experiments have shown that mixtures of 5% benzene solutions of natural and butadiene styrene rubber exfoliate, if these substances are mixed within the limits 1:9 and 9:1. The concentration of the laminae is not equal to the initial concentration. For any ratio of rubber mixtures, the experimental viscosity values are higher, whereas the turbidity of the solutions is lower than the additive magnitudes. The increase in temperature, or the introduction of large quantities of methyl ethyl ketone bring together the experimental and additive values of the viscosity of the solutions, i.e. they increase the compatibility of natural and butadiene

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SOV/69-21-2-9/22

On the Compatibility of Polymers in Solution

styrene rubber. The presence of an interpolymer in a natural and butadiene styrene rubber mixture prevents exfoliation of the solution. According to the authors the observed phenomena may be considered as the result of molecular associations of prevalently homogeneous composition. There are 5 graphs and 10 references, 6 of which are Soviet and 4 English.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im.M.V. Lomonosova (Moscow Institute of Fine Chemical Technology imeni M.V. Lomonosov)

SUBMITTED: May 9, 1958

Card 2/2

PRYAKHINA, Yu.A.

Carbonate concentrations in Maykop deposits of central Ciscaucasia.
Izv. AN SSSR. Ser. geol. 23 no.1:26-42 Ja '58. (MIRA 11:3)

1.Geologicheskii institut AN SSSR, Moskva.
(Caucasus, Northern--Carbonates (Mineralogy))

AUTHOR: Pryakhina, Yu. A.

20-1-37/58

TITLE: A Contribution to the Geochemistry of the Maykop Deposits of Central Cis-Caucasia (K geokhimii Maykopskikh otlozheniy Tsentral'nogo Predkavkaz'ya).

PERIODICAL: Doklady AN SSSR, 1958, Vol. 118, Nr 1, pp. 132-134 (USSR).

ABSTRACT: These deposits are in the above-mentioned region represented by a fairly uniform, mighty mass of dark clays with intermediate layers of sands and sandstones. Carbonate-concretions of siderite, more seldom of calcite-ankerite occur. The geochemistry of the dispersed elements was here chemically and spectroscopically investigated in 160 samples. Table 1 shows the distribution of the 13 elements (Fe, Mn, P, Cu, Cr, Ni, Co, V, Ba, Sr, Ga, Be and Mo) in rocks. The elements are very uniformly distributed in the central Maykop-layers; their content increases from the sandstones to the aleurolites and from these to the clays. An analogous image is observed in the rocks of the upper and lower Maykop. Such a distribution corresponds to the third type of Strakhov (reference 2); the ordered, smoothed one. Table 2 shows the average quantities of Fe, Mn and P in clays (they are set up with 1) and the average quantities of these elements in the siderite-concretions relative to them. From this the degree of movability

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20-1-37/58

A Contribution to the Geochemistry of the Maykop Deposits of Central Cis-Caucasia.

of Fe, Mn and P in the diagenesis can be determined. Fe is least concentrated here, P more and Mn most. Thus Mn is the most movable. The trace elements show another image. From table 3 follows that no active concentration of Cu, Cr, Ni, Co, V, Sr, Ba, Mo and Ga in the carbonate concretions takes place, on the contrary, their content in the surrounding rocks is much higher than in the concretions. Thus the trace elements in contrast to Fe, Mn and P show very little geochemical mobility in the zone of diagenesis. From table 3 also follows a much higher relative Sr-content in the concretions of the lower Maykop, as compared with those of the central and the upper one. Sr probably isomorphously replaces the Ca-ion in the molecule of CaCO_3 or in that of $\text{Ca (Mg,Fe) (CO}_3)_2$. Several horizons of black "sooty" clays occur in the Maykop deposits. By mineralogical analysis iron sulfides, fragments of fish skeletons, glauconite, grains of quartz, epidote, hypersthene, disthene, staurolite, zoisite and hornblende were found in this rock of the Batalpashinskiy horizon. Iron sulfides were represented by scanty pyrite cubes (0.1-3mm in size), pyrite balls and disperse pyrite. The comparison of the chemical and spectroscopical analyses of the "sooty" clays with those of the containing rocks showed a high concentration of Ni, Co, Zn, Pb and Mo in the clays.

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A Contribution to the Geochemistry of the Maykop Deposits of
Central Cis-Caucasia.

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The pyrite-iron content also was much increased. This latter circumstance indicates sharply reducing conditions during the formation of these black clays. Increased contents of Zn and Pb may except by the adsorption on clays and splinters of fish bones be explained by the formation of compounds difficult to dissolve, in the presence of the S^{2-} ion. This may also hold for Mo (reference 3). As neither Co nor Ni form compounds, difficult to dissolve, in such a medium, their increased content might be caused by an isomorphous replacement of Fe in the crystal lattice of pyrite. No connection was found to exist between the C_{org} -content (0,2 - 4%) and the content of dispersed elements.

There are 4 figures, and 4 references, 3 of which are Slavic.

ASSOCIATION: Geological Institute AN USSR (Geologicheskii institut Akademii nauk SSSR).

PRESENTED: July 24, 1957, by N. M. Strakhov, Academician.

SUBMITTED: July 24, 1957.

AVAILABLE: Library of Congress.

Card 3/3

KONTUKHOV, I.L.; PRYAKHINA, Yu.A.; KOMARDINKINA, G.N.

~~Lithologic characteristics of Upper Cretaceous sediments in~~
Daghestan. Izv. vys. ucheb. zav.; geol. i razv. 6 no.2:69-83
F '63. (MIRA 16:6)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Daghestan--Geology, Stratigraphic)

PRYAKHINA, Yu. A.

Geochemistry of Maykop deposits in Central Ciscaucasia. Dokl. AN
SSSR 118 no.1:132-134 Ja-F '58. (MIRA 11:3)

1. Geologicheskii institut Akademii nauk SSSR. Predstavleno
akademikom N.M.Strakhovym.
(Caucasus. Northern-Rocks, Sedimentary)

PRYAKHINA, Y. A.

11-1-3/29

AUTHOR:

Pryakhina, Yu.A.

TITLE:

Carbonate Concretions Found in Maykop Deposits of Central
Ciscaucasia (Karbonatnyye konkretsii v Maykopskikh otlozhe-
niyakh tsentral'nogo Predkavkaz'ya)

PERIODICAL:

Izvestiya Akademii Nauk SSSR, Seriya Geologicheskaya, 1958,
1, pp 26-42 (USSR)

ABSTRACT:

Carbonate concretions, especially siderites, occur frequently in many geological formations, ranging from the Carboniferous period up to the present time. Siderite concretions frequently form deposits of iron ore. Such deposits are found in the Callovian clays in the Lipetskiy district, in the clay deposits of the Kimeridgean stage of the Pliocene at Kerch and Taman, in Jurassic deposits at Dagestan, in deposits of the Cretaceous, Jurassic and the Upper Permian periods at the Vyatsko-Vychegodskiy water sheds, and in the Lower Carboniferous of the Kozhima river. The siderites of the Maykop deposit are typical diagenetic formations, the study of which is of great importance for establishing the diagenetic regularity and the forming of diagenetic ore deposits. The basic task of the author, when examining carbonate concretions of the Maykop deposits consists in finding

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Carbonate Concretions Found in Maykop Deposits of Central Ciscaucasia

the chemical composition of concretions, in clarifying the correlation existing between carbonate concretions and the kind of enclosing rocks as to quality and quantity, to examine the conditions during the formation of concretions, as well as the mapping of deposits. For this purpose, the author conducted core drilling analyses of more than 100 drill holes at different locations of Central Ciscaucasia of the Upper, Central and Lower Maykop stages. When studying the distribution of siderites and other carbonate concretions, the author used the so-called method of absolute masses by which the quantity is being given in kg per sq m. Taking the chemical, mineral and petrographic composition into account, carbonate concretions may be subdivided into four typical groups, which are: 1. Clayey siderites. 2. Clayey phosphate siderites. 3. Clayey ankerites. 4. Clayey calcites. The chemical-mineral composition of concretions is shown clearly on the diagram by Winchell (Figure 1). The chemical composition of siderites, clayey-phosphate siderites and clayey ankerites and calcites are given on the tables 1, 3 and 4. The author describes the physical and chemical properties of the above concretions and presents thermal curves on siderites,

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Carbonate Concretions Found in Maykop Deposits of Central Ciscaucasia

ankerites and calcites (Figures 3, 9 and 10). The distribution of carbonate concretions in the Lower, Middle and Upper Maykop stages is shown on 3 maps (Figures 11, 12 and 13). Carbonate concretions are embedded in clay layers of different mineral types, in which are occasionally found seams of siltstones and sandstones. Sedimentation of strata containing carbonate concretions took place at periods of inundation by sea waters. The presence of organic matter, such as bitumen, coal etc., pyrites, and siderites indicates that the formation occurred under reducing conditions. According to N.M. Strakhov, the forming of carbonate concretions is connected with diagenetic re-distribution of matter. Furthermore, the total content of iron in the initial sub-strata of deposits must not necessarily exceed the Clark content for the forming of siderite concretions. The forming of calcite and ankerite concretions in deposits where the clays are calcareous in places is governed by higher pH values and lower CO₂ concentrations resulting from an alkaline reaction of the rocks. This activates migration of calcite to points where concretion takes place.

There are 3 maps, 4 tables, 4 figures, 5 photographs, 1 dia-

Card 3/4

11-1-3/29

Carbonate Concretions Found in Maykop Deposits of Central Ciscaucasia

gram, and 7 Russian references.

ASSOCIATION: Geologic Institute of the USSR Academy of Sciences, Moskva
(Geologicheskii institut AN SSSR, Moskva)

SUBMITTED: September 27, 1957.

AVAILABLE: Library of Congress

Card 4/4

SEREGIN, A.M.; FLOROVSKAYA, V.N.; MOSKALEV, N.P.; PRYAKHINA, Yu.A.;
MAZAREVICH, I.A.

Anniversary of Professors I.A.Koniukhov. Vest.Mosk.un.Ser.4:
Geol. 17 no.1:79-80 Jan-Feb 1962. (MIRA 15:2)
(Koniukhov, Ivan Aleksandrovich, 1911-)

KOMARDINKINA, G.N.; PRYAKHINA, Yu.A.; KONYUKHOV, I.A.

Studying fractured reservoir rocks and their importance for oil
and gas prospecting in Daghestan. Razved. i okh. nedr 27 no.3:
17-26 Mr '61. (MIRA 14:5)

1. Moskovskiy gosudarstvennyy universitet.
(Daghestan—Petroleum geology)
(Daghestan—Gas, Natural—Geology)

PRYADCHENKU, AL. [Priadchenku, AL.] (Bukharest); MIKLYA, E. (Bukharest)

Triticum-agropyron hybrids in Rumania. Priroda 55 no.1:92-94
Ja '66. (MIRA 19:1)

1. Chlen-korrespondent AN Sotsialisticheskoy Respubliki
Rumynii (for Pryadchenku).

MEYERSON, G.A.; OLESOV, Yu.G.; PRYALOV, V.I.

Reduction of zirconium dioxide by carbide and calcium cyanamide.

Atom. energ. 14 no.6:563-568 Je '63. (MIRA 16:7)

(Zirconium dioxide) (Carbides) (Calcium cyanamide)

PRYALUKHINA, A.F.

Vegetation of bare mountain summits and the zone below them in the
Bikin-Iman watershed. Bot. zhur. 43 no.1:92-96 Ja '58. (MIRA 11:2)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
(Sikhote-Alin' Range--Alpine flora)

VERNONA, B.C.; VERNONA, B.C.

Microfilm segments of the Foreign Broadcast Information Act (FBIA) 161
nt. 6:1359-1362. O. 165. (MIRA 18:10)

1. Vsesoyuznyy nauchnyy politicheskii i ekonomicheskii institut. Submitted
April 13, 1965.

PRYAKHINA, Z. A.

PRYAKHINA, Z. A. --"Studies of the Analogues of Androgenic Hormones.Synthesis of
6 - (2' - methyl-cyclopentanol-3') - 1 (9) Octalone -2."
*(Dissertations For Degrees In Science and Engineering Defended
at USSR Higher Educational Institutions)(29) Min Public
Health USSR, All-Union Sci Res Chemicopharmaceutical Inst
imeni S. Ordzhonikidze VNIKhFI), Moscow, 1955

SO: Knizhnaya Letopis' No 29, 16 July 1955

* For the Degree of Candidate in Chemical Sciences.

PRYAKHINA-KON'KOVA, Ya. A., KRASINSKIY, N. P., VALUTINA, V. A. and FUZINA, Ye. K.

"Effect of Light Intensity on the Oxidation-Reduction Balance of Plants
in Connection with Photosynthesis," Fiziol. rast., 2, No/1, pp. 62-69, 1955

State University im. N. G. Chernyshevskiy, Saratov

KRASINSKIY, N.P.; VALUTINA, V.A.; PRYAKHINA-KON'KOVA, Ya.A.; FUZINA, Ye.K

Effect of light intensity on the oxidation-reduction balance
of plants in connection with photosynthesis. Fiziol.rast. 2
no.1:62-69 Ja-F '55. (MLBA 8:9)

1. Gosudarstvennyy universitet imeni N.G.Chenyshevskogo, Saratov.
(Plants, Effect of light on) (Oxidation--Reduction reaction)

USSR/Geophysics - Geology of Volga Region

FD-1260

Card 1/1 : Pub. 129-22/25

Author : Pryakhini, A., and Kozhevnikov, A.

Title : Works of the Central Volga geological expedition

Periodical : Vest. Mosk. un., Ser. fizikomat. 1 yest. nauk, 9, No 1, 147-148,
Feb 1954

Abstract : Geological problems attendant upon the construction of the Krybyshev reservoir were studied in 1951-1953 by students of the Chair of Dynamic Geology (assistant head, Prof. O. K. Lange). This chair divided, after the removal to the new buildings on Lenin Hills, into two independent chairs; Chair of Dynamic Geology and Chair of Hydrogeology and Engineering Geology. This year the Geological Faculty has organized an expedition headed by Docent G. S. Zolotarev, Stalin prize winner.

Institution : --

Submitted : --

PRYAKHINI, A.

PRYAKHINI, A.; KOZHEVNIKOV, A.

Work of the Middle Volga geological expedition. Vest.Mosk.un. 9 no.2:
147-148 P '54. (MLRA 7:5)

(Volga Valley--Geology) (Geology--Volga Valley)

L 10292-63

EWP(q)/EWT(m)/BDS-AFFTC--JD

ACCESSION NR: AP3002262

S/0089/63/014/006/0563/0568

AUTHOR: Meyerson, G. A.; Olesov, Yu. G.; Pryalochnikov, V. I. 54

TITLE: Reduction of zirconium dioxide by calcium carbide or calcium cyanamide

SOURCE: Atomnaya energiya, v. 14, no. 6, 1963, 563-568

TOPIC TAGS: zirconium dioxide, calcium carbide, calcium cyanamide, zirconium carbonitride, reduction, isobaric free-energy change

ABSTRACT: Zirconium carbide or carbonitride formation was shown to occur in the 900 to 1100C range when reduction of zirconium oxide is carried out with calcium carbide or calcium cyanamide in an inert atmosphere, while a temperature of over 2000C is required for conventional carbon reduction. Calculations of the isobaric change in the free energy of formation of the carbide and carbonitride indicated that the carbon in the calcium carbide or cyanamide may act simultaneously with calcium in the reduction of $ZrO_{sub 2}$. Experimental reduction was carried out in a tubular electric furnace with a finely ground mixture of pure $ZrO_{sub 2}$ and technical-grade calcium carbide or cyanamide in briquet form, in a

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stationary nitrogen or argon atmosphere and in a nitrogen stream. The initial composition of a batch was calculated from reactions (1) and (2) or (3) and (4) (see Enclosure). After firing and cooling, the briquets were leached out with hydrochloric acid, and the products were analyzed for total and free carbon and for nitrogen. The percent conversion to zirconium carbonitride was evaluated on the assumption that the total combined C + N + O in carbonitride is 50 at%. The effects of temperature, retention time, and type of atmosphere upon the degree of conversion are presented in Figs. 1, 2, and 3 of Enclosure. It is concluded that 1) in a stationary nitrogen atmosphere, optimum conditions for complete conversion are 4 hr at 1100C with the amount of reducing agent 20% in excess of the theoretical; 2) the consumption of calcium cyanamide (but not of calcium carbide) can be lowered to 80% of theoretical consumption based on reaction (3) when a nitrogen stream is used; 3) reduction is feasible in any protective atmosphere (such as producer or natural gas), as shown by the experiments in an argon atmosphere. Orig. art. has: 5 figures, 3 tables, and 14 formulas.

ASSOCIATION: none

SUBMITTED: 10Sep62

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ENCL: 06

SUB CODE: 00

NO REF SOV: 003

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2/12